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## ADSC/WSDOT Team Minutes

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17-June-04

### Members In Attendance

Name	Company	Telephone	E-mail
Armour Tom	DBM	253-838-1402	<a href="mailto:tarmour@dbmcm.com">tarmour@dbmcm.com</a>
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Carnevale Bob	DBM		<a href="mailto:rcarnevale@dbmcm.com">rcarnevale@dbmcm.com</a>
Clarke Patrick	WSDOT	360-705-7220	<a href="mailto:clarkp@wsdot.wa.gov">clarkp@wsdot.wa.gov</a>
Cuthbertson Jim	WSDOT	360-709-5452	<a href="mailto:cuthbej@wsdot.wa.gov">cuthbej@wsdot.wa.gov</a>
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The meeting began at 8:30 AM. Alan and Mo welcomed three new members from TBH to the team. Meeting notes of April 27 and June 10 (special slurry session) were reviewed and approved with no comments. Others in attendance:

Horst Aschenbroich Con- Tech Systems LTD 604-946-5571  
Eberhard Heinzemann Con-Tech Systems LTD 604-946-5571

### **Rebar Cage Stability Using Hoops**

Alan reported that, after consultation with Reece of the Rainier Steel, rebar cages would remain stable for erection when hoops at 6" max spacing are used. Hoops cannot be shop fabricated and will need to be field welded. This scheme is currently being practiced at the Narrows Bridge and the Sound Transit Contracts. Lap welding of the hoops in lieu of butt-welding is preferred.

**Action plan:** No further action is needed

### **Updates on Shaft Design Implementation**

**Cage Diameter:** Patrick mentioned that updates to the chart Jeff has provided are needed to finalize the chart for inclusion into the Bridge Design Manual.

Minimum Vertical Bar Spacing: Patrick confirmed that a minimum clear bar spacing of 6 inches will be specified in the new design guides.

Hoops: Implementation of hoops in lieu of spirals (for pitches less than 6") has been discussed and agreed upon in the bridge Design Office.

Centralizers: Patrick reported that only the cage caster type centralizers are acceptable. The rebar hair pins do not perform well when subjected to rotational forces. Don Morin is also pursuing his own proprietary centralizer that addresses lateral pressures against the shaft perimeter as well as rotational forces exerted on them. The team also discussed whether approved centralizer details should be placed in the plans or the Shaft Specials. Mo also handed out excerpts from the AASHTO LRFD Bridge Construction Specifications indicating spacing of centralizers at max 3 meters intervals. The team recommended rejecting this requirement. The Specials current version of 2.5 times shaft diameter or 20 feet max centralizer spacing at quarter points cage perimeter will remain in effect.

**Action plan:**

- Jeff and Patrick will finalize the rebar cage diameter chart and report back to the team at the next meeting.
- Design issues related to bar spacing and use of hoops will be addressed in a design memo by the Bridge Design Engineer.
- Patrick and Mike will decide on a list of approved centralizers and whether the specified requirements are placed in the Specials or details shown in plans.
- Patrick will revisit the adequacy of the rebar cage quarter point centralizer spacing for large diameter shafts and he will make a recommendation to the team at the next meeting.

**PGA Grout port Location**

Patrick mentioned that ungrouted voids might develop behind the anchor plates where the grout ports and vents are not located at the top of the anchor plate.

**Action plan:** All PGA submittals will be required to include grout ports and vents at the top of the anchor plates.

**Shaft Cage Vertical Tolerances**

Jeff indicated that under the current Specs, there is no vertical tolerances allowed for the shaft rebar cage. Shaft Specials 3.01.A(4) references the Standard Specs for rebar tolerances, which is grossly inadequate. Jeff referred to ACI 3.4.11 code that allows for

top of rebar cage tolerance of +6" and -3" from plan position. Mo mentioned similar tolerances are allowed under the AASHTO LRFD Construction Specifications. There were also discussions surrounding the Contractors fabricating rebar cages 1 foot longer to allow for such tolerances and trimming the cage in the field when needed.

**Action plan:** Mo will include the above recommended tolerances in the Standard specs.

### **Shaft Special Updates**

Mike presented the latest revisions to the Specials to the team. Specials 3.04 B, Jim expressed some concern that, under the proposed version, the slurry representative will not need to be present on site if shafts were to be constructed in different types of soil within the same contract. He suggested the Specials should indicate that the slurry rep should be present on site for the first shaft of each soil type. Alan mentioned that the frequency of site visits by the slurry rep should be addressed in the shaft installation submittal. Specials 3.03 L, was discussed. The amount of water flow rate into the shaft before it needs to be flooded was discussed. Water flow rate in excess of 12"/hr is mentioned as the limit in the FHWA manual.

**Action plan:**

- Mike will revise 2.04 B to read "for ..." not "by ..." .
- Mike will add a segment to the Specials 3.02 requiring the frequency of site visits by the slurry rep to be included in the shaft installation submittal
- Alan will investigate the amount of water flow rate into the shaft before it become of enough concern for the shaft to be flooded

### **Inconsistent Approval of Shaft Installation Submittals**

Don indicated that approval of the shaft installation submittal was inconsistent among the PE offices. The Eastern Region rejected a submittal for a noise wall shaft that had been approved by the SW Region. He also said that the current requirements for shaft installation submittal were cumbersome and time consuming.

**Action plan:** Alan and Mo will form a committee tasked with review of the shaft installation submittal requirements

### **Revision Proposal to The Specials 3.07D**

Mo expressed a concern about tremie placement of concrete in the shafts. He said our past experience indicates that pumping the concrete will result in fewer anomalies in shafts. If pumping is the only mean allowed for placement, it will also create a more level playing field during bidding. Most drillers agreed that pumping the concrete would provide a better product. However, there was a concern about availability of concrete pumps in remote areas of the State.

**Action plan:** Mike will take out the tremie placement out of the Specials. The ADSC/WSDO team will evaluate and recommend the need for tremie placement and availability of concrete pumps for remote projects.

### **Shaft Post Grouting**

Mo proposed some modification to the CSL tube caps for post grouting of shaft bottoms. He said we can post grout the shafts and account for the increased bearing capacity during design or as a precautionary mean for pressure grouting when shafts are founded on soft bottoms. Horst thought that this idea would be in violation of an existing patent. Jim indicated that Geotechnical Branch would not be counting on the increased end bearing capacity during design. Horst mentioned that by placing a valve at the end of the CSL tubes, post grouting could be accomplished fairly inexpensively. Peter was also of opinion that if plastic caps are utilized, they could be easily penetrated for post pressure grouting.

**Action plan:** Alan agreed to investigate use of a valve at the tip of CSL tubes and report back to the team

### **Loosening Soils by Back Spinning Augers to Facilitate casing Placement**

Mo asked the team if loosening the soil at top of the shafts by an auger, without removing the soil and before the casing is installed, was acceptable. Jim initially expressed no concerns about any changes to the boundary conditions of the shaft.

**Action plan:** Jim will research this topic and will provide input to the team

### **Future Meeting Dates**

Future meeting dates for the remainder of this year are:

- Aug 5, 2004
- Sep 16
- Oct. 28
- Dec. 9